

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

**Amendments to the Drawings:**

The drawings were objected to as incorporating new matter because of the altered order of the filter in relation to other elements. Corrected drawings were required because of the altered order of the filter in Figs. 2 and 3. More particularly, with respect to Fig. 2, the low pass filter was shown between the ADC and encoder, thus differing from the drawings in the parent application. With respect to Fig. 3, the bandpass filter was shown in a different order from that shown in the parent.

In order to expedite matters, Applicant has deleted the low pass filter of Fig. 2 as well as the bandpass filter of Fig. 3. These filters are often included with analog-to-digital converters and demodulators such as those shown in Figs. 2 and 3.

Moreover, Applicant has specified in Fig. 3 that the channel decoder 66 is a Viterbi channel decoder. Also in Fig. 3, Applicant has specified that the receiver is a direct conversion receiver. Each of these elements was originally found in Applicant's parent specification.

ATTACHMENTS: 1 ANNOTATED SHEET AND 2 REPLACEMENT SHEETS

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

### REMARKS

Applicant would like to thank Examiner Xu Mei and Examiner Andrew Graham for discussing the claims on January 26, 2006 at 2:00 p.m. EST.

Claims 1, 4, 6 and 7 remain pending in this application. These claims have been amended to further clarify the scope of the invention for the reasons set forth below. Moreover, new Claims 8-13 have been added with additional limitations discussed in the Examiner interview.

#### Rejection under 35 USC 132-New Matter

The specification was objected to under 35 USC 132 as allegedly incorporating new matter. More particularly, the specification was objected to based on a throughput rate "that may be as low as approximately 1.0 Mbps." Applicant's disclosure provided that the throughput may be approximately 1.4 Mbps. Accordingly, Applicant submits that the phrase objected to was not new matter. However, in order to further expedite prosecution, Applicant has deleted this language from the specification. Accordingly, Applicant requests that this objection be withdrawn.

#### Rejection under 35 USC 112, 1st paragraph

Claims 1 and 6 stand rejected under 35 USC 112, 1st paragraph, as allegedly failing to comply with the written description requirement. More particularly, the office action provided that the limitation "an ADC in communication with an encoder at a signal rate of less than approximately 1.0 Mbps" incorporated new matter because there was no support for this throughput rate between the ADC and encoder. Applicant has

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

amended the cited claims to read -- an ADC in communication with an encoder--, deleting the reference to the signal rate. Accordingly, Applicant submits that this rejection has been overcome.

### Rejections under 35 USC 103

Claims 1, 4, 6 and 7 were rejected under 35 USC 103 as allegedly being unpatentable over Alstatt (USPN 5771441) in view of Schotz et al (USPN 5946343) and further in view of Schotz (USPN 5491839).

Applicant respectfully submits that a *prima facie* case of obviousness has not been made since the references do not teach or suggest all claim limitations. Claims 1, 4 and 6 require a code generator that generates or modulates a "user code" that creates a unique hop pattern for each individual user. The present invention uses frequency hopping spread spectrum (FHSS) transmission technology with a unique pseudo-noise (PN) code that is long enough, and that has low cross-correlation properties so that the hop pattern is unique for each individual user. FHSS employs a data signal that is modulated with a narrowband carrier signal that "hops" in a random but predictable sequence from frequency to frequency as a function of time over a wide band of frequencies. The signal energy is spread in the time domain--as opposed to severing each bit into small pieces in the frequency domain. The FHSS technique reduces interference because a signal from a narrowband system may only affect the spread spectrum signal if both are transmitting at the same frequency at the same time. If synchronized properly, a single logical channel is maintained. With FHSS, the transmission frequencies are determined by the PN code. The receiver is set to the same hopping code and listens to the incoming signal at the right time and correct frequency.

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

By contrast, Schotz uses "one of four different PN sequences." (See Schotz '343 at Col. 16:61 to Col. 17:2) These codes are assigned to specific devices for a single household--not individual users. As such, the Schotz code may be properly deemed a "device code" as opposed to a "user code" as in the present invention. There is no mention in Schotz that the PN code must support individual users operating within the same space. By contrast, the present invention addresses the interference between individual users [parent specification/page4/lines16-22] and each PN code and its hopping sequence is generated to address the needs of individual users. (See e.g., paras. 0009 and 0011 of the present disclosure.)

While Applicant submits that the references did not teach or suggest all claim limitations as presented, Applicant has amended Claims 1, 4 and 6 to recite "a code generator" that creates "a unique hop pattern for each individual user." This amendment is made to further clarify the scope of the invention. Moreover, this limitation has been added to Claim 7, and all new Claims 8-13 further include this limitation. Accordingly, Applicant submits that the claims clearly state that this code generator is used to create a unique hop pattern for each individual user, a limitation not taught or suggested by the prior art references. Accordingly, Applicant respectfully submits that this rejection has been overcome.

Moreover, a *prima facie* case of obviousness was not made because the references do not teach or suggest the limitation directed to an analog battery-powered digital transmitter. The office action provides that the combination of Alstatt and Schotz's '343 Patent teaches a battery powered digital transmitter. Applicant respectfully submits that a *prima facie* case of obviousness has not been made. More particularly, the combination

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

of the battery-powered analog transmitter of Alstatt and the wall-powered digital transmitter of Schotz '343 would render Alstatt unsatisfactory for its intended purpose. Alstatt would suffer from a significantly reduced play time due to the power consumption of Schotz's numerous integrated circuits. Moreover, the Alstatt headphones for his portable device would be rendered too large because of the size of the integrated circuits used in Schotz.

For the same reasons of reduced play time and unwieldy headphones, the combination of Alstatt and Schotz would not provide a reasonable expectation of success. Accordingly, Applicant respectfully submits that a *prima facie* case of obviousness has not been made in this respect as well.

New limitations have been added to the new Claims 8-13, as discussed in Applicant's Examiner interview. New Claims 8 and 9 have been added to recite a channel decoder that permits soft-decision decoding. New Claims 10-11 have been added to recite a channel decoder that is a Viterbi decoder. (For further clarification, Claim 10, directed to the system, includes a limitation that the channel encoder is configured to send encoded symbols that are compatible with a Viterbi decoder). The specification has also been amended to recite that the channel decoder may be a Viterbi decoder. This material was present in the parent application to which the present application claims priority. [See page 4, line 27 of the parent application]

The Viterbi decoder--or a channel decoder that permits soft-decision decoding--is not taught or suggested by the prior art references. Schotz incorporates a 1/2 rate extended Golay block coding scheme. (Col. 9:19-26) Schotz's block coding scheme differs significantly from the coding scheme of the present claims. More particularly,

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

soft-decision coding may be used to prevent a greater band of interference than the Golay block coding scheme.

While the Viterbi channel encoding/decoding scheme permits hard decision coding as found in Schotz, it is the ability of this Viterbi scheme to further permit soft-decision coding that permits the Viterbi scheme to suppress a broader range of interference from other users. The Viterbi channel encoding/decoding scheme prevents interference (or jamming) from other system users. This interference can be represented as follower (or repeater) interference.

The follower (or repeater) jammer transmits frequency-hopped narrowband interference using the same hop sequence as the communicator, where the communicator is the primary user. This is equivalent to at least one additional system user in operation within the same space (or range) of a primary user. The follower (or repeater) jammers' output--resulting from use by other system users--must arrive at the primary user's frequency-hopping receiver hop frequency band space and dwell there long enough to cause interference before hopping to the next hop frequency band. The partial band jammer that is referenced in Schotz's design is defined as a transmitter (non-hopping type) that transmits its available power into a limited bandwidth which is smaller than the spread spectrum bandwidth. (See Schotz '343, para. 0016, lines 1-5)

Contrary to hard-decision decoding, soft-decision decoding includes additional information symbols to determining the reliability of the symbols being decoded. Included in the additional information symbols of the present invention is jammer state information (JSI). JSI includes information regarding the potential jamming threat, including the hop rate, dwell time, bandwidth, and so on, that would cause interference in

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

the system of the present disclosure. The JSI permits the receiver headphones to know if other system users are in the area, and if so, then the Viterbi decoder assigns less weight to the symbols that may be jammed so that it makes the a better estimate of the transmitted code sequence.

The Schotz design uses hard-decision decoding (see e.g., reference SRT241203) that does not incorporate JSI, as required with soft-decision decoding. In addition, Schotz states that forward error correction (see e.g., SRT241203) can be eliminated by frequency hopping is used in his design. (See Schotz para. 0016, lines 5-10)

Repeater jamming interference occurs when other system users are within relatively close range to one another. In accordance with the present invention, a repeater jammer transmits frequency-hopped narrow band interference using the same hop rate and dwell time as the primary user. This is the case for one or more other system users, because the same hop rate and dwell time is used for all system users, but each has a different PN code sequence. So, the repeater jammer (represented by other system users) may transmit an interference signal that may hop along with the primary system user to create interference in the receiver headphones of the primary system user. Schotz does not suppress this type of interference.

Schotz provides states that his system adds "control information" so there is no "need for independent stereos" in the same space. (See Schotz Abstract). Accordingly, Schotz does not design his system to function with multiple users (i.e., multiple stereos) in the same space. In fact, he teaches away from the use of independent stereos.

Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

Schotz states the forward error correction is not needed (See Schotz at Column16:1-10). Further, the hard-decision decoder Schotz uses does not apply additional confidence symbols (like JSI) to maximize accurate decoding.

New Claims 12 and 13 have also been added to recite a 2.4 GHz direct conversion receiver. These receivers are compatible with systems incorporating frequency hopping spread spectrum (FHSS) transmission technology. Applicant respectfully submits that the prior art does not teach or suggest a direct conversion receiver. Schotz '343 incorporates a superheterodyne receiver that uses quadrature phase-shift keying as a modulation technique. This superheterodyne receiver incorporates filtering, oscillator and frequency synthesis components that are not needed when a direct conversion receiver is used. Moreover, at the time of Applicant's invention, the QPSK modulation technique was not compatible with modulation using frequency shift keying (FSK), so Schotz does not suggest a direct conversion receiver.

#### Clarifying Amendments

Minor amendments have further been made to the claims in order to correct typographical errors. More particularly, Claim 4 has been amended to recite that the method comprises the steps of various elements, with steps being plural instead of singular. Claim 4 has also been amended to recite, as part of the method "*communicating*" said analog music signal instead of "communication". Further, Claim 4 has been amended to delete reference to a distance of reception. The preambles of Claims 6 and 7 have been amended to delete reference, respectively, to "an analog headphone jack connected to a battery powered spread spectrum transmitter" and "to be



Serial No.: 10/648,012  
Amdt. Dated: March 14, 2006

Attorney Docket No.: 73785-013

received by a battery powered spread spectrum headphone receiver." A semicolon has been added after the first element of Claim 7 directed to "a receiving antenna in communication with a spread spectrum headphone receiver."

Claim 6 has also been amended to recite that the battery powered digital transmitter is *configured to convert* an analog audio music signal, as opposed to "converts" an analog audio music signal.

### Conclusion

Applicant respectfully submits that the claims are in condition for allowance. A notice of allowance is respectfully requested.

While Applicant does not believe any fees are necessary since this response is submitted within the two-month window after the December 30, 2005 office action. However, if any such fees are deemed necessary, please charge any additional fees which may be required, or credit overpayment to Deposit Account No. 50-1946, referencing number 073785-0013.

Respectfully submitted,

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Date

Daphne L. Burton

Daphne L. Burton

Registration No. 45,323

MCDERMOTT WILL & EMERY, LLP  
2049 Century Park East, 34th Floor  
Los Angeles, CA 90067  
Telephone: (310) 277-4110  
Facsimile: (310) 277-4730

ANNOTATED SHEET

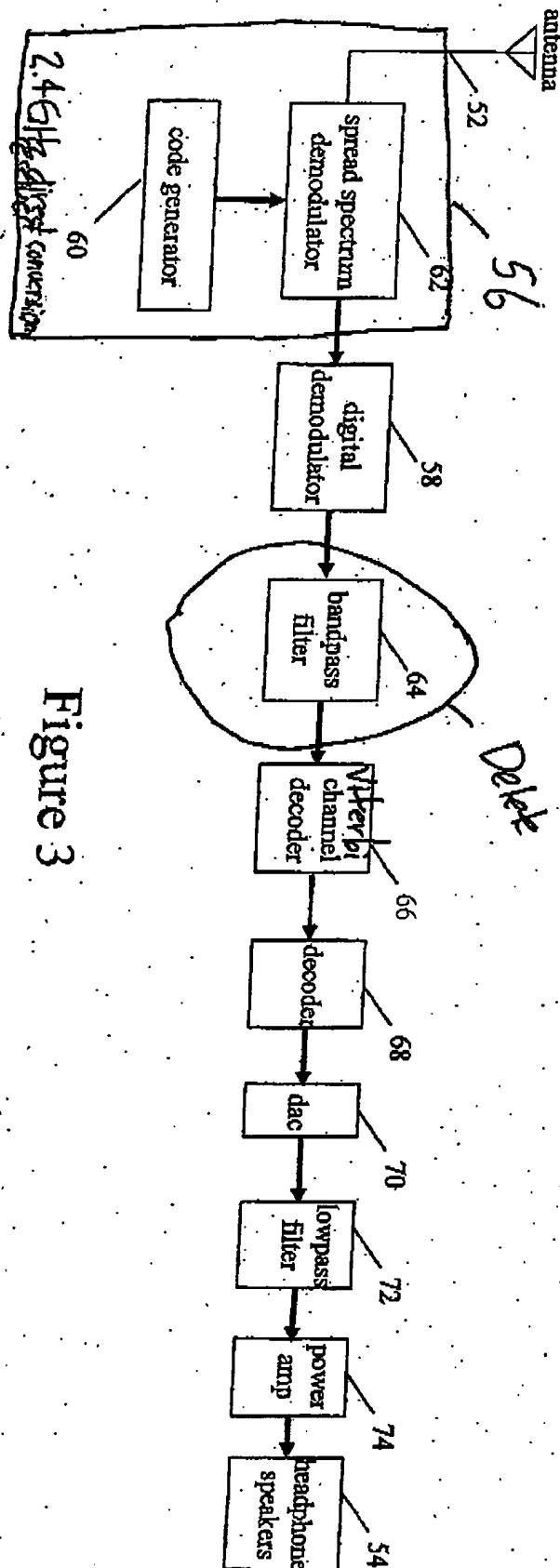


Figure 2

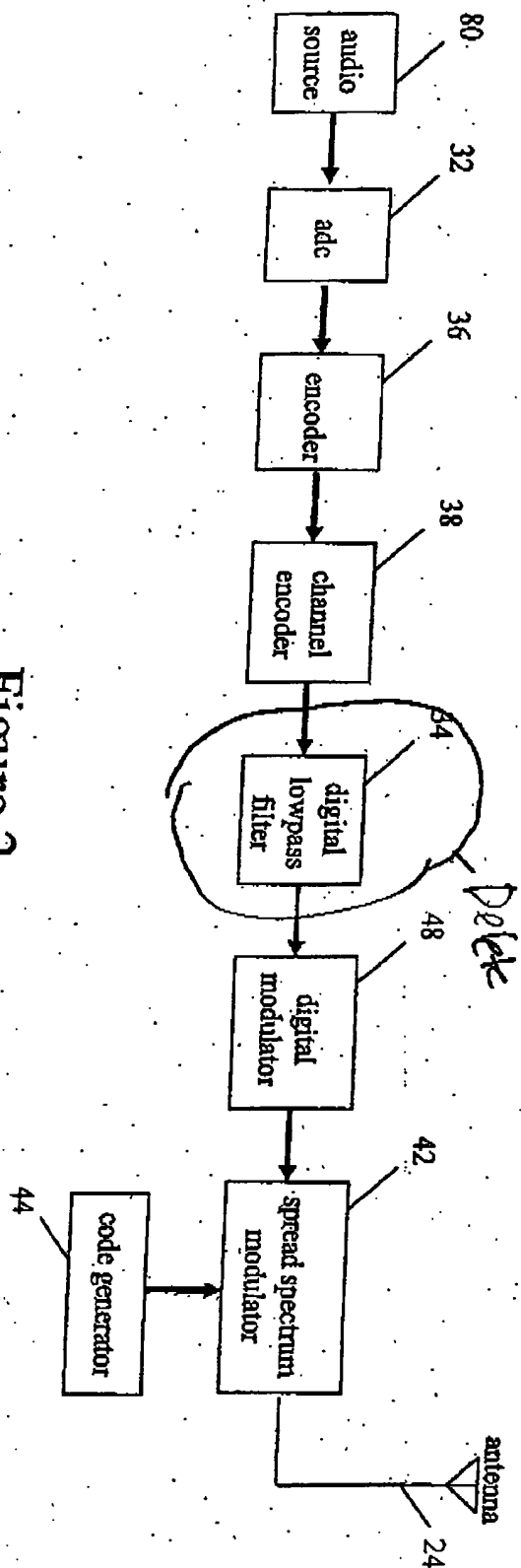


Figure 3

ANNOTATED SHEET

Figure 4

